



impulse

Murrelektronik Customer Magazine



EDITORIAL

Dear Customer,

At Murrelektronik, we put the needs of our customers first.

To meet these needs, we develop and produce highly modern components. Our components feature innovative properties and powerful diagnostic tools. For our customers, we enable short installation times, quick startups, minimal downtimes, and access to detailed diagnostic functions.

Based on the diversity and variety of our first-class products, we work together with you to produce well-thought-out and innovative installation approaches for applications in numerous markets and industries. We are always looking at the big picture! We know the special challenges, perspectives, approaches, and wishes of our customers, as well as their problems and questions. We are your reliable partner for the entire range of industrial automation.

In this issue of our customer magazine, Impulse, we want to illustrate this with examples of a few selected markets and industries.

In **mobile machines**, we are able to slim down bulky cable harnesses or replace them altogether. Our customers can install much faster with this option and have a significantly higher output in the same amount of time. In the **automotive** sector, we help our customers globalize and develop electromobility. Specifically, this means that we send competent teams to sites around the world and provide first-class consultation and service. In the **food industry and packaging technology**, our customers are offered universal decentralized installation concepts. With appropriate stainless-steel products, we can handle the highly sensitive area of open food processes and primary packaging. In the broad field of **machine tool manufacturing**, we can offer a diverse portfolio of successful approaches. We are therefore able to find the best solution for highly individualized customer wishes and tasks. This maximizes the cost-benefit ratio.

We hope to have sparked your curiosity with our examples from selected markets and the variety of other topics in this issue. Have fun reading and discovering many new and inspiring ideas with Murrelektronik!

stay connected!

Frank Eckert
CEO

BEST PRACTICE

A Premium Cinema Experience with Emparro

➤ Read more on Page 04



MODLINK HEAVY

Heavy-duty All-purpose Connectors

➤ Read more on Page 07



LOOKING AT THE BIG PICTURE

stay connected.

We put the challenges and needs of our customers first!

LOOKING AT THE BIG PICTURE

stay connected.



MOBILE WORK MACHINES

SIGNIFICANTLY HIGHER OUTPUT IN THE SAME AMOUNT OF TIME

A primary concern of companies that manufacture mobile production machines is shortening the lead times in production. Output needs to increase; more machines need to be produced in the same amount of time.

Flexible and expandable distribution solutions are in demand. Installation errors are not welcome.

With its preassembled and sheathed connection lines and distribution boxes, Murrelektronik has the optimum products and solutions for realizing installations quickly and easily.

Commonly used sensors and actuators in mobile production machines are hydraulic valves, temperature sensors, pressure transmitters, and rotary encoders. If these parts need to be connected to a controller, Murrelektronik distribution boxes are ideal for easy installation. Cable harnesses are either slimmed down or, in the best case, replaced entirely.

The passive MVP Xtreme and xtreme DB distribution boxes designed for use in mobile production machines are very robust, sealed, and resistant to media and UV radiation. Even CAN-based sensors and actuators can be easily incorporated into installation concepts. The connectors of Murrelektronik products are robust and sealed, have been tested multiple times, and have proven themselves in use. Connectors, conductive materials, and lengths are fully customizable and can usually be delivered individually.

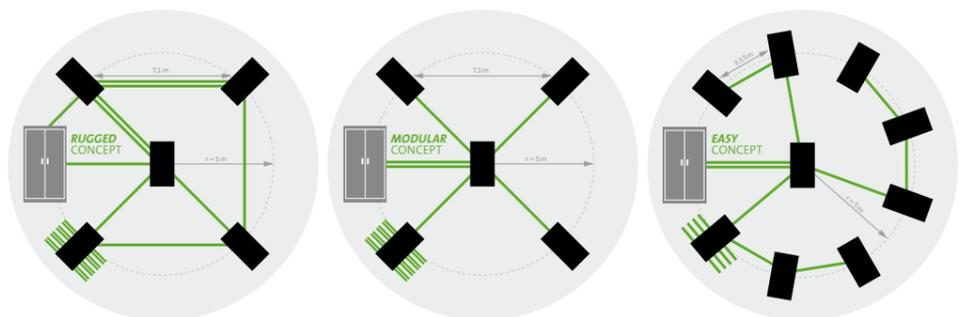
CUSTOMER-SPECIFIC SOLUTIONS

If you need components that are accurately adapted for special application purposes but do not want to rely on do-it-yourself solutions, you have found the right partner with Murrelektronik. Murrelektronik creates professionally manufactured solutions from many decades of acquired expertise.

MACHINE TOOL MANUFACTURING

COST-EFFECTIVENESS

... and the satisfaction of choosing the right installation approach



Machine tool manufacturing is a broad field. The needs and wishes of customers relating to decentralized installation are just as diverse as the machines and plants themselves. Of course, there is also a common thread, however: Cost-effectiveness, low overall costs, and more competitiveness are always in demand.

Good installation concepts link all I/O points to the controller in an economical manner. The term “cost-effectiveness” is defined a little differently from person to person: Aspects such as material costs, the time needed for installation, and the degree of functionality and technology are weighted differently in every question – depending on the company philosophy.

This is why Murrelektronik does not offer just a single solution for a given challenge. Instead, customers can select from a variety of passive and active installation concepts and different structures (ring structures, superstructures in a line, topologies in star formation) – there are a range of possibilities that can be combined together.

Electrical engineers in machine tool manufacturing benefit from this: They can select an approach for their machines that meets all of their technical requirements – and is tailored to their needs for cost-effectiveness! Murrelektronik provides comprehensive expertise in all questions of fieldbus technology, safety, and IO-Link.

COMPETENT CONSULTATION

Our consultants will be glad to visit you and inspect your machine with you. We identify your challenges and work with you to develop ideas and concepts for your machine and system installation. A competent analysis enables a well-functioning approach that best matches your philosophy and expectations relating to cost-effectiveness.

We put the challenges and needs of our customers first!

The innovative and reliable products from Murrelektronik form the basis for well-thought-out installation concepts in a variety of markets and industries. The key is looking at the big picture: the special challenges, perspectives, and needs that are crucial for developing the

optimum installation concept for each individual application. Examples from selected sectors show clearly how this can happen in very different industrial fields ...



AUTOMOTIVE

FIRST-CLASS CONSULTATION – WORLDWIDE PRESENCE

The automotive market is in motion. Important development paths are ...

- **Global orientation:** Automotive companies are represented worldwide. They define, together in many cases, internationally valid standards. The (still) low level of mobilization in many countries promises high growth rates.
- **Increasing electromobility:** The number of electrical vehicles is increasing. This has impacts on engine and gearbox manufacturing. The production of batteries is becoming more important; the charging infrastructure is being built.
- **Growing environmental awareness:** Vehicle manufacturing consumes resources. Automotive companies are working on making production more energy efficient. The term the “green factory” is the buzzword for this development.

Murrelektronik accompanies automotive companies on this path. Promising products and concepts make possible economic installations in newly developing areas of production. The innovation to replace pneumatic components with electric ones generates great potential with an eye to energy-efficient automation.

A GREAT TEAM!

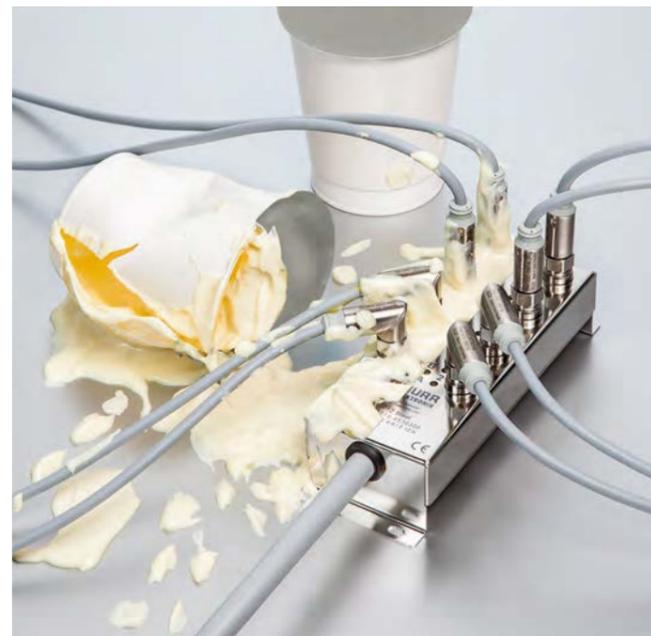


Murrelektronik employees at the “Global Automotive Meeting” at the company’s head office in Oppenweiler, on transnational coordination of automobile projects and the exchange of new developments and technologies.

What’s crucial is that Murrelektronik sends its excellent teams to be present at automotive companies around the world. Close networking ensures first-class consultation and service. Murrelektronik sees itself as an intermediary between countries and the technologies – striving always to satisfy the needs of the motorists and their engine builders and to lead the way to the optimum installation concept.

FOOD INDUSTRY AND PACKAGING TECHNOLOGY

UNIVERSALLY DECENTRALIZED INSTALLATION WITH MURRELEKTRONIK



The food industry continues to make rapid progress in technological developments. The industry has a strong tendency toward decentralization – not only in upstream and downstream processes, but also in the highly sensitive area of open food processes and primary packaging.

Forward-looking technologies are essential in order to meet the growing demands for flexibility and modularity.

For this sector, Murrelektronik leverages its expertise acquired over many years from decentralized installation technology. This is accomplished in the form of new products that meet the highest requirements for hygienic design.

Forward-looking and universally decentralized installation concepts reduce installation time and simplify maintenance and service. Wiring in hygienic areas can be greatly simplified by using passive distributors or fieldbus technology.

CUBE67 HD STAINLESS-STEEL FIELDBUS MODULES IN IP69K

Decentralized installation up to zone 1

- Durable protection class IP69K
- Sealed stainless-steel housing
- Very easy to clean
- Proven Cube67 technology
- IO-Link integration

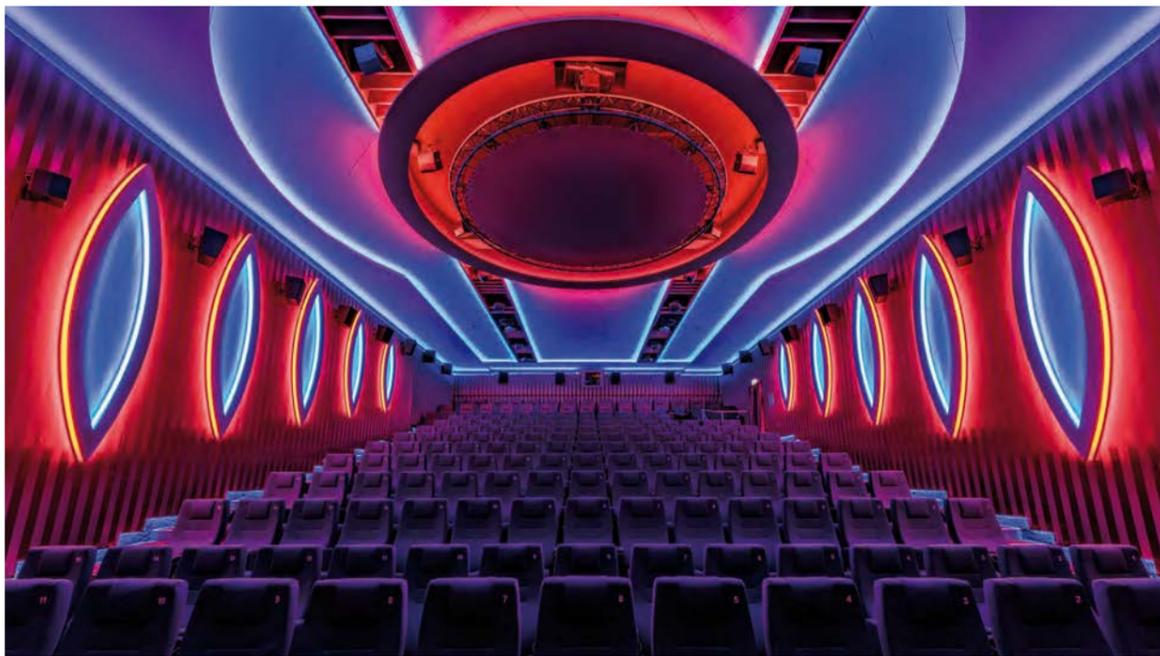




A PREMIUM CINEMA EXPERIENCE ...



with PREMIUM POWER by Murrelektronik – Emparro power supplies by Murrelektronik supply the LED lighting in the Traumpalast



The Traumpalast in Leonberg is a real jewel and attracts cinema lovers from a large region. When constructing their latest movie theater, the Lochmann Filmtheaterbetriebe in Rudersberg designed everything to ensure that their visitors would have a cinema experience “par excellence”. Visitors can relax in their comfortable seats with plenty of leg room, watch movies in modern 3D technology in all ten cinemas, and treat their ears to a very special sound experience.

One fascinating highlight for all visitors is the impressive light show. “Different lighting moods are an integral part of the cinema experience at Lochmann movie theaters,” says Eduard Henke, CEO of the Freilicht! company from Berlin, which installed the extraordinary decorative lighting in the Traumpalast. Already upon approach to the Traumpalast, the colorful lights on the façade cast their spell on the visitors. The luminous steps in the lobby are a real eye-catcher. Eduard Henke and his employees also installed countless LEDs in the cinema auditoriums. They highlight edges and base boards. Before a movie starts, a colorful light show raises visitors’ anticipation of the latest blockbuster.

Freilicht! installed 3500 meters of LED strips in the new Traumpalast in Leonberg. Eduard Henke commissions the production of these strips with RGB LEDs specifically for his requirements. The active combination of red, green, and blue light covers the entire color spectrum. The LEDs are controlled by dimmers located in standardized control cabinets. The dimmers pass the three pulse-width-modulated voltages to the LEDs to produce the desired colors and level of brightness.

Since the cinema lighting requires a lot of power due to the sheer volume – despite the very efficient LED technology in itself – and intensive use over many hours a day requires a sustained, high-powered installation solution, Freilicht! decided to implement the supply of power with the 24-VDC Emparro 3~

MASTER OF ALL PROCESSES

Easy and cost-efficient connection of the Modlight70 signal tower using the Cube67 fieldbus system



In the Oppenweiler Logistics Center, Murrelektronik does more than ship products to the customer. They are also actively involved in helping processes run without a hitch. Modlight70 signal towers provide clear signaling; the Cube fieldbus system allows for effective and efficient transmission of the necessary data.

When companies from the automation industry submit an order to Murrelektronik, the Oppenweiler Logistics Center operates like clockwork. The ordered products are transported by conveyor belts to the picking and packing stations, and they are packed and on their way to their destination in no time at all.

To keep logistics operating at full speed, all picking and packing stations are usually occupied. When one employee goes on break, a coworker (“relief person”) takes over the tasks immediately. When packaging material is about to run out, an “internal logistics specialist” intervenes so that bottlenecks do not occur. In the past, one got an overview of who was working where on a board in the Logistics



Center; individual signal towers were used as a status indicator for individual areas.

A team managed by Oliver Behnke, Director of the Murrelektronik Logistics Center, undertook the task of simplifying this system. A decision was made to install an entire row of Modlight70 signal towers in a clearly visible location. Since then, employees in the operations area and colleagues in the control room of the Logistics Center can see at a glance whether all processes are running on schedule.



Manuel Senk of Murrelektronik (left) and Eduard Henke of Freilicht!



Emparro power supplies in the control cabinet

switching power supplies from Murrelektronik. Roughly 80 components of this highly-efficient power supply are installed in the control cabinets of the Traumpalast and ensure a reliable supply of power.

The decision for a three-phase power supply was due to the special characteristics of cinema operation: The balanced three-phase load means that the neutral wire is not a current-carrying conductor. This prevents any negative effects on the sound system, with its excellent Dolby-Atmos technology.

Freilicht! CEO Eduard Henke was impressed by the high efficiency of the Emparro power supplies of up to 95%: "This means that they produce very little heat and do not need a cooling system in the cabinet," the expert explains. The components experience little thermal load and last longer. Since the Emparro power supplies by Murrelektronik also set a standard in terms of the component width and output the same power at half the width (compared to many other devices), Freilicht! is

able to use smaller control cabinets. This is a great benefit since they are installed in the projection booths of the individual auditoriums where space is scarce.

The Freilicht! employees have set the utilization level of the devices at about 70% of the load limit. "This will give us maximum life expectancy and high reliability. We wouldn't want our visitors to end up sitting in the dark," says Eduard Henke. The fact that switching to full lighting after the light shows results in brief peak loads is not a problem: The Power Boost function (150% power for up to 5 seconds) and the Hyper Boost function (approximately 400% for up to 20 milliseconds) ensure that Freilicht! need not lose any sleep over this.

It is interesting that Freilicht! uses an operating voltage of 24V to supply the LED strips. Eduard Henke explains: "This is actually an innovation. Usually people use 12V." He refers to Ohm's law which states that for the same power, twice the voltage results in only half the current. "Accordingly, we have a proportionally lower voltage

drop and this means that the LEDs at the end of the auditorium are as bright as the one's at the front."

As Freilicht! manages several cinemas in different locations in Berlin, remote maintenance is an exciting topic to them. For instance, a status report on the PWM modules is sent to the control center every week. One highlight of the Emparro power supplies that goes even further is the preventative diagnostic function. The device monitors diverse parameters including internal temperature, load situation during operation, the number of start processes, and the life span of the components. Once the optimal time for replacing the Emparro 3~40A has been reached, this information is passed on to the control center via an easily integrated signal contact. The power supply is not replaced too early, which ensures optimal use of available resources, but also not too late, which avoids failures and annoyance.

Manuel Senk, product manager at Murrelektronik and cinema buff, says: "The Traumpalast sets some impressive standards. We are proud to have contributed to the efficient supply of the lighting technology, and as a movie buff it makes my heart beat faster."

Employees at the picking and packing stations operate the lamps from their workstation by remote control. When the green LED element is illuminated, everything is in order. The yellow element indicates that an employee is taking a break, so a "relief person" can be ready to step in. Blue stands for a packaging material bottleneck; red means an interruption. The signals are unambiguous – nothing has to be done "on call" anymore.

The large Logistics Center proved to be a challenge, which became evident in an early phase of planning. Relying on radio signals to be clearly transmitted over long distances or even through walls seemed impractical to Oliver Behnke's team. For this reason, the team decided to transmit the radio signals digitally through cables using a decentralized installation solution based on the Cube fieldbus system.

The receivers were located in control cabinets at multiple locations within the Logistics Center. These receivers control the inputs of the Cube20 IP20 fieldbus module. These input modules communicate with the PLC, which processes the signals and sends them to the Cube67 fieldbus system in the field, which controls the Modlight70 signal towers.

The use of Cube20 in the control cabinet is a cost-efficient solution: instead of many individual I/O cards, only one module has to be mounted on the DIN rail. The high packing density makes this possible. "Specifically, we



had to install only one module in each control cabinet," reports Oliver Behnke. In practice, single-channel diagnostics directly on the module has proven to be advantageous. "If there is an error anywhere in the wiring, the LED will light up at the affected slot, and we can fix the error quickly without having to do a lot of searching."

Practical modules with a direct Modlight signal connection are used to connect the actuators in the Cube67 system. These "Cube cable modules" have a 1.5-meter long connecting cable; the 8-pin M12 connector is connected directly to the signal tower. The individual connection modules are in turn connected to a system line that carries the signal as well as the power. "With this system, we do not need a separate power supply. This makes installation quick and easy."

The Modlight70 signal towers can be assembled in a modular fashion from a connection element and several colored LED modules with a 70 mm diameter through a bayonet locking system. "In the Logistics Center, we assigned colors to certain functions which is why we use the signal towers in the identical configuration," explains Oliver Behnke. He values the energy-saving LED technology, the long service life, and the maintenance-free modules.

MICO PRO

CURRENT MONITORING MODULARIZED TO THE MAXIMUM EXTENT



Mico Pro is the new and innovative current monitoring system from Murrelektronik. The modular system enables you to adapt systems precisely to suit specific applications – offering a favorable cost-benefit ratio while also being economical in their use of space. The patented tripping process assures optimum machine availability.

Mico Pro monitors load and control currents and identifies critical moments. It signals limit loads and switches defective channels off in a targeted manner – according to the principle of “as late as possible, as early as necessary.”

Mico Pro is a modular system for 12 and 24 VDC operating voltages. Components can be selected for the particular application from numerous Mico Pro modules. You can

select between modules with one, two or four output channels. The tripping currents are fixed (2, 4, 6, 8, 10 and 16 A) or can be flexibly adjusted from 1 to 10 A or from 11 to 20 A.

Mico Pro has an integrated potential distribution concept for +24 (or +12) and 0V that significantly simplifies switch cabinet wiring. There are connection options for +24 V and 0V on each channel.

The innovative bridging system consisting of two bars and lateral spring contacts for connecting diagnostic and control signals is easy to handle. It is designed for a total current of up to 40 A. All inputs and outputs of the system are provided with push-in spring clamp terminals.

Great importance is attached to the diagnostic functions of Mico Pro. Each channel is equipped with an LED for status indication on the device and digital status signals can be transferred to the PLC.

A channel-specific switching function via an PLC signal allows the Flex modules to switch system components on and off without any additional contactors, relays, or optocouplers. Not only short switching frequencies (of up to 10 Hz) but also longer frequencies can be realized.

Mico Pro can be cascaded. This means: on a Mico channel, another Mico Pro station can be connected.



Tobias Berner
Product Manager Power Distribution

“IN THE FINAL ANALYSIS, OVERALL COSTS ARE LESS”

With Mico Pro®, the potential distribution concept is already integrated. Murrelektronik Product Manager Tobias Berner explains the benefits of this solution.

Mr. Berner, what advantages does the integrated potential distribution concept have? It allows potential groups to be built and several consumers to be connected directly. This decentralizes installations in the control cabinet and reduces the expenditure for wiring. In the final analysis, overall costs are less.

How is potential distribution implemented specifically? Mico Pro® has at each output a 24-volt terminal as well as a connection option for zero potential. The use of potential distributor modules multiplies the number of monitored outputs. Since they are already supplied with 0 V through the bridge system, it is enough to run a wire from one monitored output

to any positive contact of the potential distributor module. This offers maximum flexibility.

How does this affect the space in the control cabinet? We have customers who have saved up to 80 percent of space. Entire terminal strips, which require a lot of space, are not needed.

Are there other advantages? The installation becomes very organized. The entire Mico Pro® system has a plug-in design. This saves about 75 percent of the time needed for installation. During operation, this technology is also completely maintenance free and vibration resistant.



Portrait of Mico Pro®

➔ youtube.com/Murrelektronik

What it really means...

MURRELEKTRONIK CONNECTORS ARE 100 PERCENT TESTED!

Sebastian Richter, Product Manager at the Competence Center for Connectors at Murrelektronik in Stollberg, explains:

“We put our preassembled connectors through rigorous testing before we send them to our customers. We conduct accurate electrical testing, including a high-voltage test, a test for switching the wires, and a short-circuit test. We test the function and then visually inspect the connectors. In this way, we ensure that first-class connectors are delivered to our customers without exception. Processes are also configured before and during production to ensure 100 percent to quality. This starts with the incoming goods inspection with our numerous test characteristics before the cables go to series production. As a part of random sampling for quality control, we also test the depths of insertion of the plug pins and the individual withdrawal force of the socket contacts. All of this gives us and our customers a good feeling: Murrelektronik connectors work – 100 percent!”



MODLINK HEAVY

MURRELEKTRONIK HEAVY-DUTY ALL-PURPOSE CONNECTORS



The heavy-duty connectors from Murrelektronik's Modlink Heavy series ensure the reliable transmission of signals, power, data, and pneumatics, even in the toughest industrial environment.

They consistently protect interfaces from water, coolants, lubricants, dirt, and high mechanical loads. Murrelektronik has a wide range of heavy-duty connectors. The greatest strength of the product line is its con-

MAXIMUM FLEXIBILITY

- Four housing types
- Seven sizes
- Three locking types
- Countless contact inserts – fixed-pin and modular

figuration flexibility. This allows the optimum configuration of Modlink Heavy to be used in every application. Murrelektronik's Modlink Heavy heavy-duty connectors have a superior seal – with a protection rating of up to IP68. Country-specific certifications including UL and CSA allow these products to be used across the globe.

HOLD TIGHT!

Practical Retaining Clips for Murrelektronik Connectors



The new and universal Murrelektronik retaining clips for M8 and M12 round plug connectors make fastening extremely easy in plants and machines.

The compact retaining clips made of robust plastic can be used side-by-side in any number in a modular fashion. The modular feature allows numerous connectors to be secured next to one another. They replace cable ties which get the job done but are not nearly as practical as retaining clips in terms of installation and maintenance: retaining clips allow connectors to be disconnected and reconnected manually in one step without tools.

The retaining clips are available in two sizes, one for classic M8 and M12 connectors and – with a somewhat larger-sized clip – for shielded M12 cables. The two version can be easily combined with each another.

The brackets can be attached with screws or cable ties anywhere on machines and plants. An integrated radius allows them to be installed even on tubes.

MURRELEKTRONIK OPENS BRANCH OFFICE IN INDIA

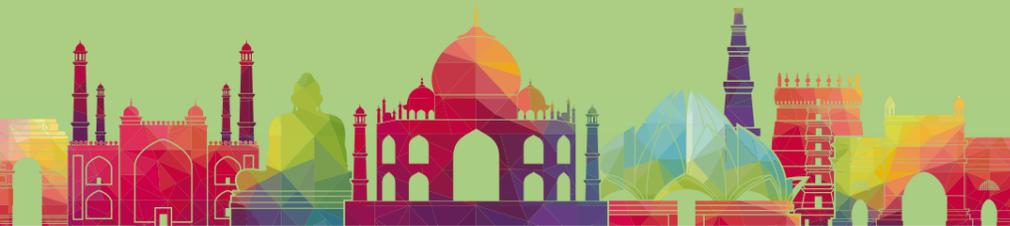


Murrelektronik has had its own branch office in India since April 2017. Preparations for this establishment took a long time: In close collaboration with Techworks, Murrelektronik has established a foothold in the Indian market, made its brand known, and gained customers within the last five years.

Many global companies and automotive specialists run production sites in India. They will soon have local and direct support. The branch office is located in the megacity of Bangalore, which not only is known worldwide for its IT industry, but is also a hot spot for mechanical and plant engineering. To deal with the highly dispersed and densely populated country, Murrelektronik operates four other sales offices in India, a country that is nine times as big as Germany.

The South Asian country of India has established itself as one of the largest emerging markets worldwide in recent years. Stable GDP growth suggests that India will become an important player in global trade in upcoming years. Local companies are establishing themselves in machine tool manufacturing with remarkable quality. The forecast for the automotive industry is also rosy: so far only a third of the population is motorized. Numerous forward-looking projects are also underway in logistics and the solar industry.

The branch office director of Murrelektronik in India is Chetan T.A., who has already been actively working locally for the company's interests since 2012. The branch office employs a total of 13 people. The sales associates have all obtained their sales license from Murrelektronik's head office in Oppenweiler and possess a comprehensive knowledge of products and solutions. Select and competent distributors are also a part of the sales network.



INSIGHTS INTO CURRENT QUESTIONS FROM MEDIUM-SIZED BUSINESSES



High-ranking visitors at Murrelektronik: Dr. Nicole Hoffmeister-Kraut, the Minister of Economic Affairs of the State of Baden-Württemberg, made a visit to the Oppenweiler-based automation company on her tour of the region. Together with Caroline Hafner-Pinnel, the Advisory Committee Chair, representative of the owning family and the company management, she addressed current issues from medium-sized businesses. She was also informed about "Casa do Zezinho", a children's aid project supported by Murrelektronik.

Photos: Dennis Züljekar

MODLIGHT ILLUMIX FOR PERFECT ILLUMINATION IN DAYLIGHT QUALITY

The Modlight Illumix series of machine lamps by Murrelektronik optimally illuminate machines and plants with maintenance-free and long-lasting LED technology in daylight quality.

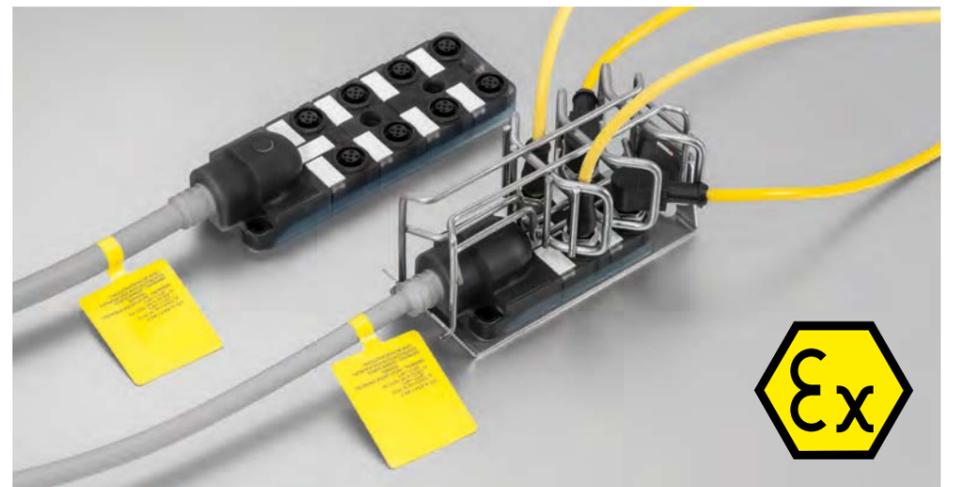


"Slim Line" lamps with their compact construction are a reliable solution in machines and plants in tight spaces. In harsh industrial environments, lamps of the "Classic Line" are the ideal light source with their aluminum housing and 4-millimeter thick single-pane safety glass. For this reason, they are also specified for use in classic plant and machine construction environments.

The Modlight Illumix "Xtreme Line" with the high protection class IP69K is ideal for use directly in work areas in constant contact with coolants and lubricants. It continues operating reliably and is 100 percent sealed even in sub-tropical conditions with temperatures of up to 55°C. The LED technology of the lamps is more efficient than halogen tubes since its light yield of 105 lm/W provides the same number of lumens with significantly less power consumption. LEDs are lead-free and mercury-free and do not create a burden on the environment.

In practice: All Modlight Illumix lamps can be operated directly with a variety of Murrelektronik fieldbus modules.

EXACT12 ATEX PREVENTING EXPLOSIONS



Murrelektronik's Exact12 ATEX distribution boxes are ideal for use in potentially explosive atmospheres of zones 2 (gas) and 22 (dust), such as those in powder coating, painting facilities, wood processing plants, and flour mills.

PUR and is available in a variety of lengths.

The perfectly adapted and specially designed cage ensures clear visibility of all LEDs and nameplates and protects the distribution box.

Practical and undetachable

The sealing contour of Exact12 ATEX is integrated in the housing and thus undetachable, even if mishandled. On other ATEX distribution boxes, the entire distribution box to be replaced for safety reasons if a seal became damaged or lost.

The robust distribution boxes with four or eight slots (having two signals each) meet the relevant requirements of the ATEX EU Directive 2014/34/EU and are approved in compliance with the standards EN 60079-0/-15/-31. The distribution boxes have been tested with regard to temperature, impact, heating, and seal. The trunk cable is tightly connected. It is made of high-quality and halogen-free